

barrier". An "encapsulation barrier" is recited in all of the independent claims (including claim 41), and, therefore, applicant assumes the antecedent objection to this recitation was inadvertent.

The Examiner has also objected to the drawings. Amendments have been accordingly made and separate sheets illustrating the changes in red are attached. Specifically, lead line 29 has been added to Figure 1; reference to element 37 has been deleted from the detailed description of Figure 1; lead line 29 has been added to figure 7; lead lines 16 and 18 have been added to Figure 9; and reference 40 in Figure 10B has been changed to 48. To overcome the objection to Figure 10A, the detailed description has been amended to refer collectively to both Figures 10A and 10C. With respect to the objection to Figure 8 and numeral 44, it is noted that page 12, line 13 of the application refers to Figure 8 as showing an embodiment "similar to the use of a dam 44". In other words, no reference to an element 44 in Figure 8 is intended.

The Examiner has rejected all of the claims as either anticipated or obvious in view of Khandros, United States Patent No. 5,148,265. The applicant agrees with the Examiner that Khandros is, indeed, a very broad patent which discloses a wide variety of subject matter related to semiconductor chip assemblies. In fact, Khandros certainly discloses some of the steps of the present invention.

However, the present application is addressed to precise manners of encapsulation and these methods are simply not disclosed in the reference. For example, claim 1 recites a protective barrier which is placed on the top layer of a chip assembly so that while an encapsulant flows, the protective barrier prevents the encapsulant from contacting

the terminals. In claim 41, the encapsulant is made from a preform which has a predetermined volume less than the area defined by the encapsulation area and, although the preform is liquefied to allow the encapsulant to flow through the encapsulation area, the terminals continue to remain exposed. In claim 48, the encapsulant is introduced between the top layer and the chip, thus inherently preventing the encapsulant from contacting the exposed terminals on the top layer.

Although Khandros may discuss encapsulation, it does not teach or suggest the precise methods claimed in the present invention, particularly with regard to the different methods of preventing the encapsulant from contacting the terminals. By way of example, Khandros simply states:

A compliant, low elastic modulus encapsulant 158 is applied around the periphery of the interposer so as to encapsulate chip contacts 130 and the outward extensions 154 of leads 150. However, the encapsulant does not cover the first surface 144 of interposer 146.

(Col. 14, lines 45-50). In other words, Khandros does not discuss specifically how the encapsulant is applied or how the encapsulant is prevented from covering the surface of the interposer. On this basis alone, Khandros cannot anticipate the more detailed encapsulation methods of the present invention.

The Examiner has argued that the mold and interposer of Khandros correspond with the encapsulation barrier and protective barrier of the claims. However, Khandros does not teach that its interposer is functionally equivalent to the protective barrier of the present invention. In the present application, claim 1 recites both a "top layer" having an array of exposed terminals disposed thereon and "a protective barrier for protecting the terminal on the top layer from an encapsulation material".

To the extent that Khandros' top layer 138 of interposer 136 can be likened to such a protective barrier, Khandros does not teach or suggest that the top layer is "for the protecting the terminals on the top layer from an encapsulation material". Khandros simply teaches that the encapsulation material 158 should be kept off of the top layer 138 of the interposer 136, but not that the top layer 138 is meant to accomplish that task. In fact, given the small scales on which these assemblies are made, one of ordinary skill in the art would not look at Figure 7 of Khandros and conclude that top layer 138 is sufficient to keep the encapsulant from running over the top layer. Further, in Khandros' embodiment of col. 14, lines 52-57, the structure does not have the "exposed terminals" (referred to in claim 1) at the time the encapsulant is applied. In Khandros' embodiment of col. 14, lines 65 et. seq., there may be exposed terminals, but the reference does not suggest that top layer 138 protects the terminals from the encapsulant. Therefore, the interposer of Khandros does not anticipate or render obvious the protective barrier of the claim 1.

Yet further, the Examiner has not explained how all of the elements of claims 41 and 48 are anticipated or obvious in view of Khandros. With respect to claim 41, Khandros does not disclose encapsulation which has a predetermined volume less than the area defined by the encapsulation area. With respect to claim 48, Khandros does not disclose placing an encapsulation material into an encapsulant area defined by an encapsulation barrier and between the top layer and chip.

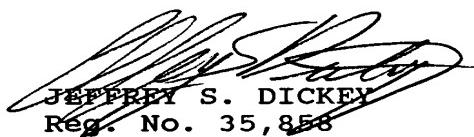
For all of the foregoing reasons, applicant respectfully submits that none of the independent claims are anticipated or obvious in view of Khandros, and requests

allowance therefor. In light of the applicant's view that all of the independent claims are allowable, the dependent claims are, of course, considered allowable as well and no further comment on the dependent claims is considered necessary.

As it is believed that all of the objections set forth in the Official Action have been overcome by the foregoing amendments and remarks, favorable reconsideration and allowance of the entire application as amended is earnestly solicited. If, for any reason, the Examiner is of the opinion that such action cannot be taken at this time, they are invited to telephone the undersigned at (908) 654-5000 so as to overcome any additional objections they may have. If there are any additional charges in connection with this amendment, the Examiner is authorized to charge Deposit Account No. 12-1095 therefor.

Respectfully submitted

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